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APPARENT NEST SITE COMPETITION BETWEEN THE PAPER WASP *POLISTES FUSCATUS* (HYMENOPTERA: VESPIDAE) AND THE HOUSE WREN

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Abstract.—Small colonies of *Polistes fuscatus* can suffer significant mortality due to attacks by house wrens. The wrens apparently compete with the wasps for nest sites.

The house wren *Troglodytes aedon* uses a variety of cavities as nest sites, including nest boxes, discarded tin cans, holes in banks, natural cavities in trees or stumps and bleached skulls of livestock (Bent 1948). Colonies of social wasps, particularly of the genus *Polistes,* also make use of similar nest sites and have been recorded in nest boxes (McAtee 1929, 1931), discarded tin cans and similar items (Rau 1942), holes in banks (Hungerford and Williams 1912) and cavities in trees and skulls of livestock (Rau 1931, 1942). Consequently, it is not surprising that there are occasional records of wrens and other small birds being displaced by social wasps (Bent 1948; Hart 1941; McAtee 1929, 1931). However, because the male house wren is exceedingly aggressive, he attempts to occupy all available nest sites in his territory (Bent 1948), *T. aedon* is potentially capable of competing with social wasps.

This note reports on a nesting pair of *T. aedon* that systematically exterminated approximately 15–17 colonies of the social wasp, *Polistes fuscatus* (Fabricius) during apparent competition for nest sites. The study area was located at the Wasp Studies facility on the Erindale Campus of the University of Toronto, Ontario, Canada. The particular location, which has been described previously (Gibo 1978), consists of two sets of nest boxes (sites A and B) and an abandoned shed located in a field adjacent to a woodlot. At site A 40 nest boxes were arranged in a 5×8 grid, with each nest box approximately 0.75 m from any other nest box. At site B 8 nest boxes were arranged in a 2×4 grid. The two sets of nest boxes were separated by approximately 20 m. The shed was approximately 20 m from nest box site A and 10 m from site B. The facilities had been utilized by a resident population of *P. fuscatus* for the past 6 seasons.

Poultry screen, with openings of 2.5 cm in diameter, was placed over the openings of the nest boxes and the windows of the shed. The screen was installed to protect the *P. fuscatus* colonies from attacks from birds, chiefly blue jays, red-winged blackbirds, Baltimore orioles, and other medium size species that are known to prey on *P. fuscatus* colonies in early summer (Gibo 1978). House wrens, which had not been observed at the facility in previous seasons, were able to slip through the poultry screen.

The pattern of colony initiation for *P. fuscatus* was typical. Foundresses initiated colonies in April or May and often were joined by other foundresses. By mid-June approximately 20–45 colonies were established in the study area and these remained active for the rest of the season. The colonies increased in size steadily and the first workers appeared by late June to early July. Although small nests with only a few cells were often abandoned early in the season, they were not knocked down and remained in place, empty and deserted, throughout the season. Predation on the colony by birds normally does not occur in this area until late June or early July, and in past seasons was prevented at the nest boxes with the screen (Gibo 1978).

In the spring of 1979 the normal pattern of colony development was observed at grid A until May 22 when a colony, with two foundresses and 13 cells, was found knocked down and all eggs and adults were missing. By this date at least 13 and possibly 15 colonies already were established. On June 5 three more colonies, one a two foundress colony with 12 cells, and the rest single foundress colonies, were found destroyed. All had constructed at least 10 cells and, judging from records of previous years, normally would have survived. Piles of twigs were found on the bottoms of two of the nest boxes that had been occupied by the *P. fuscatus* colonies. By June 12 all of the initial colonies were either destroyed or deserted and piles of twigs (nest building efforts of the *T. aedon* male) were found in all but two nest boxes. The pattern of colony development was similar at grid B. Two colonies were initiated and both were destroyed by early June. The nest boxes received deposits of twigs. A female joined the male on approximately the first of June and one of the nest boxes was subsequently utilized to rear a brood.

The colonies at the shed had a normal season. Nineteen colonies were established by mid-May, 18 of which were still surviving by mid-June. The single failure was not associated with destruction of the nest, but with loss (or desertion) of the single foundress. Colonies in the shed were completely destroyed by birds on two previous occasions, both in early July. The first attack occurred early in the study, prior to installation of the poultry screen on the shed windows. The second attack occurred two years later when birds entered through a hole near the door. This year the wrens apparently avoided the colonies in the shed.

The complete extermination of the box nesting colonies at the study sites differs from reports of other bird-*Polistes* interactions. It has been documented that birds prey on the adult wasps and brood, and usually attack prior to or shortly after the emergence date of the first few workers. At this time the colonies represent a large and relatively defenseless food supply (Gibo 1978; Gibo and Metcalf 1979). Although the house wrens may have been feeding on the wasps, the behavioral patterns observed, including (1) removal of all *Polistes* nests in boxes, regardless of size (most nests only contained a few eggs when removed), (2) filling the nest boxes with sticks,

and (3) ignoring the *P. fuscatus* colonies in the shed, indicate that competition for nest sites was the main *Polistes*-wren interaction. Consequently, territorial behavior and nest site competition by house wrens appears to represent a major threat to *P. fuscatus* colonies during the early period of colony initiation and may occasionally be responsible for local extinction of a concentration of colonies. Despite the tendency of the *P. fuscatus* foundresses to initiate colonies in the immediate area of the parental nest site (Gibo 1972; Rau 1940; West-Eberhard 1969), the total destruction of local concentrations of colonies as a result of predatory or territorial activities of birds, suggests that dispersal must play a major role in maintaining the population.

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